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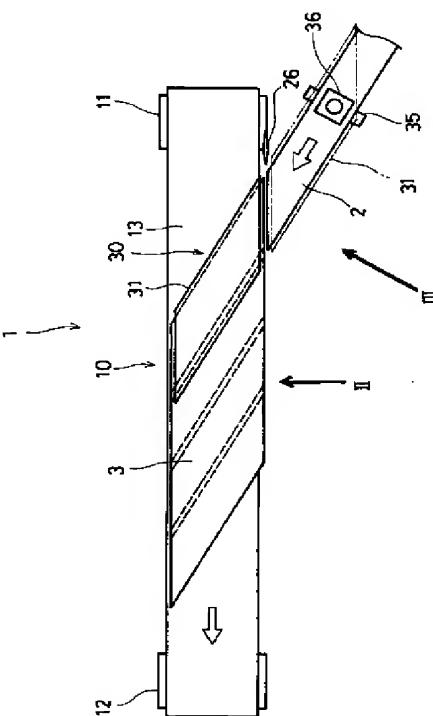
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(54)【発明の名称】 帯状部材の接合方法および接合装置

(57)【要約】

【課題】 帶状部材の幅長のバラツキにより生じる接合不良を解消し品質を維持することができる帶状部材の接合方法および接合装置を供する。

【解決手段】 コンベア13上に側方の定位置から一定方向に帶状部材2を所定量供給し、同帶状部材2を切断し、切断された帶状部材2をコンベア13で移動し、続けて供給される後行の帶状部材2の端縁部を前記移動した先行の帶状部材2に重畳し、同重畳部を接合することを順次繰り返す帶状部材の接合方法において、コンベア13上に供給される帶状部材2の幅長を測定し、同測定値に基づきコンベア13の移動量を制御して先行の帶状部材2と後行の帶状部材2の重畠幅を略一定に調整する帶状部材の接合方法および接合装置。



## 【特許請求の範囲】

【請求項1】 コンベア上に側方の定位置から一定方向に帯状部材を所定量供給し、同帯状部材を切断し、切断された帯状部材を前記コンベアで移動し、続けて供給される後行の帯状部材の端縁部を前記移動した先行の帯状部材に重畠し、同重畠部を接合することを順次繰り返す帯状部材の接合方法において、

コンベア上に供給される帯状部材の幅長を測定し、同測定値に基づきコンベアの移動量を制御して先行の帯状部材と後行の帯状部材の重畠幅を略一定に調整することを特徴とする帯状部材の接合方法。

【請求項2】 帯状部材を移動するコンベアと、  
前記コンベア上に側方の定位置から一定方向に帯状部材を所定量供給する供給手段と、

前記供給手段の帯状部材を供給する前記コンベアの直前に設けられた切断手段と、

前記コンベア上で先行の帯状部材と後行の帯状部材の重畠部を押圧して接合する押圧接合手段と、

前記切断手段の近傍に設けられ供給される帯状部材の幅長を測定する幅長測定手段と、

前記コンベア、前記供給手段、前記切断手段、前記押圧接合手段を駆動制御して一連の帯状部材の接合を行う制御手段とを備え、

前記制御手段は、前記幅長測定手段の測定信号を入力して同測定信号の測定値に基づいて前記コンベアの移動量を制御して先行の帯状部材と後行の帯状部材の端縁部どうしの重畠幅を略一定に調整することを特徴とする帯状部材の接合装置。

【請求項3】 前記供給手段は、前記コンベア上に定位置から斜め方向に帯状部材を供給することを特徴とする請求項2記載の帯状部材の接合装置。

【請求項4】 前記幅長測定手段は、前記供給手段により供給される帯状部材をカメラにより撮影し、その撮影画像を分析して帯状部材の幅長を測定することを特徴とする請求項2または請求項3記載の帯状部材の接合装置。

【請求項5】 前記供給手段に帯状部材を両側から挟むようにガイドする一対のガイド部材を備え、

前記幅長測定手段は、前記一対のガイド部材間の距離を測定して帯状部材の幅長を測定することを特徴とする請求項2または請求項3記載の帯状部材の接合装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、帯状部材を接合する方法および装置に関する。

## 【0002】

【従来の技術】タイヤ構成部材には内部にスチールコード等を埋設した帯状部材を所定長さに順次切断し、切断面でない端部どうしを重ねて接合して新たな帯状部材を製造する方法がある。

【0003】その装置としては、コンベアに側方の所定位臵から斜め所定位方向に帯状部材を所定量供給し、コンベアの側縁に沿って切断し、切断された帯状部材をコンベアにより所定量移動し、続けて所定位から斜め所定位方向に帯状部材をコンベア上に所定量供給し、前記コンベアにより所定量移動した先行する帯状部材に後行の帯状部材がその端部を重畠させて接合するものである。

【0004】供給される帯状部材の規定の幅長および重畠部の所要の幅長から予めコンベアの移動量を算出して、同移動量に設定してコンベアを駆動制御することで、コンベアが先行する帯状部材を設定された移動量だけ移動し後行する帯状部材を供給すると、両帯状部材の互いの端縁部が重なり、同重畠部を接合することができる。

【0005】すなわち供給手段により供給され切断される帯状部材が一定の移動量で間欠的に移動するコンベアに同じ位置から順次供給されるので、切断された帯状部材はコンベア上で一定のピッチで端縁部を重ねて配列することができ、効率良く接合作業が行われる。

## 【0006】

【発明が解決しようとする課題】しかるに帯状部材は、ラインスピードの増減により、その幅長にバラツキが生じるのは避け難く、この幅長のバラツキは帯状部材が一定の移動量で移動するコンベア上で一定ピッチで配列されると、その重畠部の幅長のバラツキとなる。この重畠部の幅長のバラツキは、接合不良を生じ、コードが埋設された帯状部材の場合に埋設されたコードのピッチのバラツキを生じ、品質を維持することが困難となる。

## 【0007】

【0007】本発明は、かかる点に鑑みなされたもので、その目的とする処は、帯状部材の幅長のバラツキにより生じる接合不良を解消し品質を維持することができる帯状部材の接合方法および接合装置を供する点にある。

## 【0008】

【課題を解決するための手段および作用効果】上記目的を達成するために、本発明は、コンベア上に側方の定位置から一定方向に帯状部材を所定量供給し、同帯状部材を切断し、切断された帯状部材を前記コンベアで移動し、続けて供給される後行の帯状部材の端縁部を前記移動した先行の帯状部材に重畠し、同重畠部を接合することを順次繰り返す帯状部材の接合方法において、コンベア上に供給される帯状部材の幅長を測定し、同測定値に基づきコンベアの移動量を制御して先行の帯状部材と後行の帯状部材の重畠幅を略一定に調整する帯状部材の接合方法とした。

【0009】コンベア上に供給される帯状部材の幅長にバラツキがあってもこのばらついた幅長を測定し、同測定値に基づきコンベアの移動量を制御して、先行の帯状部材と後行の帯状部材の端縁部どうしの重畠幅を略一定に調整することができる。したがって帯状部材間の接合

不良を解消して品質を高く維持することができる。

【0010】請求項2記載の発明は、帯状部材を移動するコンベアと、前記コンベア上に側方の定位置から一定方向に帯状部材を所定量供給する供給手段と、前記供給手段の帯状部材を供給する前記コンベアの直前に設けられた切断手段と、前記コンベア上で先行の帯状部材と後行の帯状部材の重畳部を押圧して接合する押圧接合手段と、前記切断手段の近傍に設けられ供給される帯状部材の幅長を測定する幅長測定手段と、前記コンベア、前記供給手段、前記切断手段、前記押圧接合手段を駆動制御して一連の帯状部材の接合を行う制御手段とを備え、前記制御手段は、前記幅長測定手段の測定信号を入力して同測定信号の測定値に基づいて前記コンベアの移動量を制御して先行の帯状部材と後行の帯状部材の端縁部どうしの重畳幅を略一定に調整する帯状部材の接合装置である。

【0011】供給される帯状部材の幅長を幅長測定手段が測定し、その測定値に基づいてコンベアの移動量が制御され、先行の帯状部材と後行の帯状部材の端縁部どうしの重畳幅を略一定に調整されるので、帯状部材間の接合不良を解消して品質を高く維持することができる。

【0012】請求項3記載の発明は、請求項2記載の帯状部材の接合装置において、前記供給手段が、前記コンベア上に定位置から斜め方向に帯状部材を供給することを特徴とする。

【0013】供給される帯状部材にコードが長尺方向に指向して埋設されている場合に、コンベア上に斜め方向に供給されると、コンベア移動方向に対してコードが斜めに配設された状態で帯状部材が移動され、同移動方向に順次帯状部材が接合されていくことになり、コードが斜めに埋設された所謂バイアスコードの帯状部材を形成することができる。

【0014】請求項4記載の発明は、請求項2または請求項3記載の帯状部材の接合装置において、前記幅長測定手段が、前記供給手段により供給される帯状部材をカメラにより撮影し、その撮影画像を分析して帯状部材の幅長を測定することを特徴とする。

【0015】供給される帯状部材をカメラにより撮影し、その撮影画像を分析して帯状部材の幅長を測定するので、帯状部材に非接触で精度良く帯状部材の幅長を測定することができる。

【0016】請求項5記載の発明は、請求項2または請求項3記載の帯状部材の接合装置において、前記供給手段に帯状部材を両側から挟むようにガイドする一对のガイド部材を備え、前記幅長測定手段が、前記一对のガイド部材間の距離を測定して帯状部材の幅長を測定することを特徴とする。

【0017】帯状部材をガイドするガイド部材を利用してガイド部材間の距離を測定することで、帯状部材の幅長を測定することができる。

## 【0018】

【発明の実施の形態】以下本発明に係る一実施の形態について図1ないし図5に図示し説明する。本実施の形態の帯状部材の接合装置1の全体の概略平面図を図1に示す。供給される帯状部材2を接合し新たな帯状部材3を形成し移動する作業は、ベルトコンベア10上で行われる。

【0019】ベルトコンベア10は、前後一対の回転ロール11、12にコンベアベルト13が架渡され、一方の回転ロール12の回転軸に嵌着されたタイミングブーリ12aとACサーボモータ15の駆動軸に嵌着されたタイミングブーリ15aとの間にタイミングベルト16が架渡されている。したがってACサーボモータ15の駆動でタイミングベルト16を介して回転ロール12が回転し、回転ロール12の回転がコンベアベルト13を回動し、コンベアベルト13上の帯状部材3を移動する。

【0020】このベルトコンベア10に対して側方定位置から一定斜め方向に向け帯状部材2を供給するローラコンベア20が設けられている。なおローラコンベア20の代わりに単にプレートを用いてもよい。該ローラコンベア20は、回転ロール11側にあってコンベアベルト13の移動方向に対して左側から30度の角度で帯状部材2をコンベアベルト13上に供給することができるよう設けられている。

【0021】帯状部材2が供給されるコンベアベルト13の左側縁に沿ってカッター26が走行するように切断装置25が配設されている。カッター26はシリンダ27の下方に突出した伸縮自在のロッド27aの下端に取り付けられ、シリンダ27自体は、コンベアベルト13の左側縁の上方を前後に走行するように吊設されている。

【0022】シリンダ27がカッター26を下降して前後に走行することで、カッター26が、コンベアベルト13に供給された帯状部材3をコンベアベルト13の左側縁に沿って切断することができる。なおカッター26は、下降して押し切る所謂ギロチン式のものを採用してもよい。

【0023】コンベアベルト13に供給される帯状部材2は、複数本のスチールコード4をゴムでコーティングして帯状に成形したもので、スチールコード4は帯状の長手方向に指向して埋設された状態にある。そして帯状部材2を押出成型する過程で帯状部材2の両側に耳ゴムが形成されるが、図4に示すように左方の耳ゴムは切り取られ右方の耳ゴム2aは残されたままの帯状部材2が供給される。

【0024】ローラコンベア20上に載置された帯状部材2をコンベアベルト13に移すのに、上方に引出装置30が架設されている。引出装置30は、切断された帯状部材2と略同じ平行四辺形状をした吸着板31が水平姿勢で上方より吊設されており、同吸着板31は帯状部材2より若干幅が大きく内部に電磁石が内蔵されていて、帯状部材2内のスチールコード4を吸引し帯状部材2を吸着するこ

とができる。

【0025】吸着板31は、ローラコンベア20の端部の上方とその延長したコンベアベルト13の上方との間を帶状部材2の搬送方向に沿って往復自在に支持されるとともに、上下に昇降可能に吊設されている。

【0026】したがってローラコンベア20により搬送された帶状部材2の先端部に吸着板31を下ろし電磁石を励磁することで先端部を吸着し、吸着したまま上方へ引き上げてコンベアベルト13の方へ一定量引き出し、定位置で下ろし、電磁石を消磁することで、コンベアベルト13上に帶状部材2を供給することができる。

【0027】なお帶状部材2より若干幅が大きい吸着板31は、押圧接合手段として利用され、コンベアベルト13上で端縁部どうしを重畳させた帶状部材2の上に吸着板31を押圧して端縁部の接合を行う。吸着板31の押圧に対してコンベアベルト13の裏面下側にコンベアベルト13に沿って受板32が設けられている。

【0028】帶状部材2を供給するローラコンベア20の途中のローラ21、21間に幅方向に指向して長尺の蛍光灯35が配設され、搬送される帶状部材2を下側から照射し、両側から光がはみ出している。蛍光灯35の真上で帶状部材2を挟んで上方にCCDカメラ36が吊設されている。CCDカメラ36が検出した信号は、コンピュータに入力され分析される。

【0029】したがって帶状部材2の下側から照射された光が帶状部材2に遮られ両側からはみ出した光をCCDカメラ36が撮像し、この光を検知した両側の画素から両画素間の距離が示す実際の距離をコンピュータが演算して帶状部材2の幅長（耳ゴム2aを含む）を測定することができる。

【0030】このようにCCDカメラ36は、帶状部材2に非接触で幅長を精度良く測定することができる。なおCCDカメラ36は、引出装置30の吸着板31より高い位置にあって互いに干渉しない。

【0031】帶状部材2の幅長を演算するコンピュータは、この帶状部材2の幅長に基づいて前記ベルトコンベア10のコンベアベルト13を回動させるACサーボモータ15を駆動制御するようになっている。

【0032】本接合装置1は、以上のように構成されており、その動作手順を説明すると、まず接合する初めは、ローラコンベア20上の帶状部材2の先端部を引出装置30の吸着板31が吸着してコンベアベルト13上に斜め30度の角度で一定量引き出し、停止しているコンベアベルト13上に載置し、次いで切断装置25のカッター26を下降して走行し、帶状部材2をコンベアベルト13の左側縁に沿って斜めに切断する。

【0033】この間にローラコンベア20の次に引き出される後行の帶状部材2をCCDカメラ36が撮像し、コンピュータがその帶状部材2の幅長を演算しておく。そしてカッター26を元のホームポジションに戻すとともに

に、吸着を解いて吸着板31を上昇して解放した帶状部材2をACサーボモータ15の駆動によりコンベアベルト13を回動して所要の移動量だけ移動する。

【0034】この移動量は、コンピュータが先に演算した後行の帶状部材2の幅長に基づき決定し、ACサーボモータ15を駆動制御して先行の帶状部材2を決定された移動量だけ高い精度で移動する

【0035】そしてコンベアベルト13による移動と略同時に引出装置30の吸着板31は、ローラコンベア20上に移動し、後行の帶状部材2の先端部を吸着してコンベアベルト13上に一定量引き出し載置する。

【0036】先行の帶状部材2に対して後から載置される後行の帶状部材2が一部端縁が重なるように、先行の帶状部材2は所要移動量だけ移動させられている。コンベアベルト13の搬送方向に対して先行の帶状部材2の後端縁に当たる耳ゴム2aの部分に略後行の帶状部材2の前端縁が重畳し（図4①、②参照）、その重畳幅しが常に所要の一定幅になるように先行の帶状部材2の移動量は制御されている。このコンベアベルト13による先行の帶状部材2の移動量の算出例は後記する。

【0037】こうして所要の一定幅Lで端縁どうしを重畳して吸着板31により載置された後行の帶状部材2は、吸着板31により上方から押圧されて重畳部を圧着し接合する。そして切断装置25のカッター26を走行して後行の帶状部材2をコンベアベルト13の左側縁に沿って斜めに切断し、その間に次にローラコンベア20上に引き出される帶状部材2をCCDカメラ36が撮像し、コンピュータがその帶状部材2の幅長を演算しておく。

【0038】以上の作業が順次繰り返して行われ新たな帶状部材3が形成されていく。新たな帶状部材3は、コードが斜めに埋設された所謂バイアスコードの帶状部材を形成することになる。

【0039】帶状部材2を接合するときに、後行の帶状部材2の幅長に基づいて先行の帶状部材2の移動量を制御することで、帶状部材2の幅長にバラツキがあっても重畳幅を常に所要の一定幅に維持することができ、接合不良を生じさせない。

【0040】重畳幅Lを所要の一定幅に維持することで、図4の①に示すように先行する帶状部材2の概ね耳ゴム2a部分に一定幅Lで後行の帶状部材2の前端縁が重なり、圧着され接合されると、図4の②に示すように帶状部材3の内部に埋設されたスチールコード4が接合部においても略所定の間隔で配列された状態となり、品質の向上を図ることができる。

【0041】後行の帶状部材2の幅長に基づき先行の帶状部材2を移動する移動量を制御する一例を図5に基づき説明する。200mm幅の帶状部材が所定量引き出されて60度の角度で切断され、重畳幅は2mmとする。

【0042】先行の帶状部材2を400mm移動すると、後行の帶状部材2とは重ならずに端面どうしが当接する

ことになるので、4mm移動量を減らした396mmとすれば重畠幅を2mmとすることができます。帯状部材2の幅長が常に正確に200mmが確保されるのであれば、常に一定の396mm移動すればよいが、帯状部材2はラインスピードの増減により、その幅長にバラツキが生じるのは避け難い。

【0043】いま後行の帯状部材2の幅長が199mmとなつたとすると、先行の帯状部材2を396mm移動したのでは、重畠幅は1mm不足することになる。そこで後行の帯状部材2の幅長199mmから重畠幅2mmを確保するために394mmの移動量を算出して、先行の帯状部材2を移動制御すればよい。また逆に帯状部材2の幅長が201mmとなつたときには、398mmの移動量とすれば、重畠幅2mmを確保することができる。

【0044】以上のように後行の帯状部材2の幅長に基づいて先行の帯状部材2の移動量を制御することで、帯状部材2の幅長にバラツキがあつても重畠幅を常に所要の一定幅に維持することができる。

【0045】以上の実施の形態では、帯状部材の幅長をCCDカメラで撮像して測定していたが、別の方法により測定する実施の形態を図6に示す。なお測定手段のほかは、前記実施の形態と同じであり、同じ部材は同じ符号を用いる。

【0046】帯状部材2をコンベアベルト13に供給するローラコンベア20の両側に中央位置決めを行うガイド部材51, 52が互いに中央線に対して対称に移動自在に配設されるとともに、両ガイド部材51, 52は互いに近づく方向に付勢されており、間に帯状部材2を挟むようにしてガイドしている。

【0047】この両ガイド部材51, 52の動きをポテンショメータ53が検出することで、帯状部材2の幅長を測定することができる。この測定結果に基づいてACサーボ

モータ15を制御しコンベアベルト13の移動量を調整して接合に係る重畠幅を一定に維持し、接合不良を防止することができる。

【0048】以上の実施の形態の引出装置は、電磁石による吸着板であったが、空気を吸引するバキューム手段により帯状部材を吸着するようにしてもよい。別途押圧接合手段を備えて帯状部材の重畠部を押圧して接合するようとする。

【0049】押圧接合手段としてはコンベアベルト13の上方に幅方向に亘ってスponジを巻いたローラを昇降自在に設け、端縁部を重ねられた帯状部材2, 2がコンベアベルト13によって搬送される際に前記ローラの押圧を受けて重畠部の接合を行う方法がある。

#### 【図面の簡単な説明】

【図1】本発明の実施の形態に係る帯状部材の接合装置の全体の概略平面図である。

【図2】ベルトコンベアの側面図である。

【図3】図1におけるIII矢視図である。

【図4】帯状部材の接合の様子を示す説明図である。

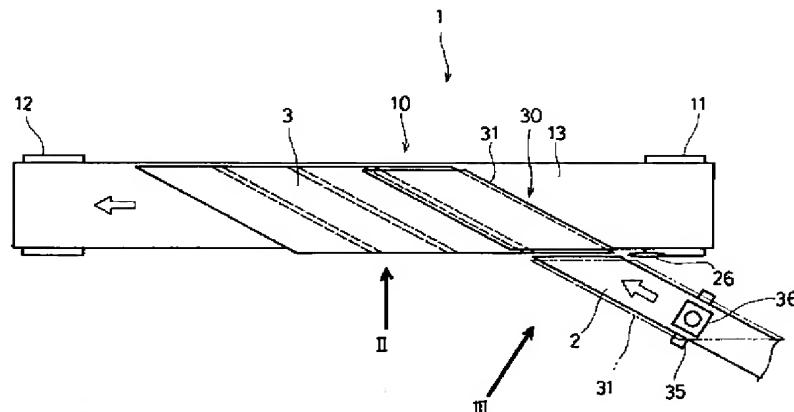
【図5】帯状部材の接合の状態を示す一つの具体例である。

【図6】別の実施の形態の接合装置の概略平面図である。

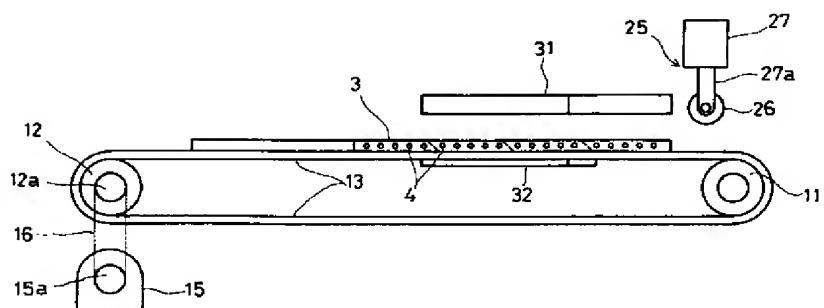
#### 【符号の説明】

1…接合装置、2, 3…帯状部材、4…スチールコード、10…ベルトコンベア、11, 12…回転ロール、13…コンベアベルト、15…ACサーボモータ、16…タイミングベルト、20…ローラコンベア、21…ローラ、25…切断手段、26…カッター、27…シリンダ、30…引出装置、31…吸着板、32…受板、35…蛍光灯、36…CCDカメラ、51, 52…ガイド部材、53…ポテンショメータ。

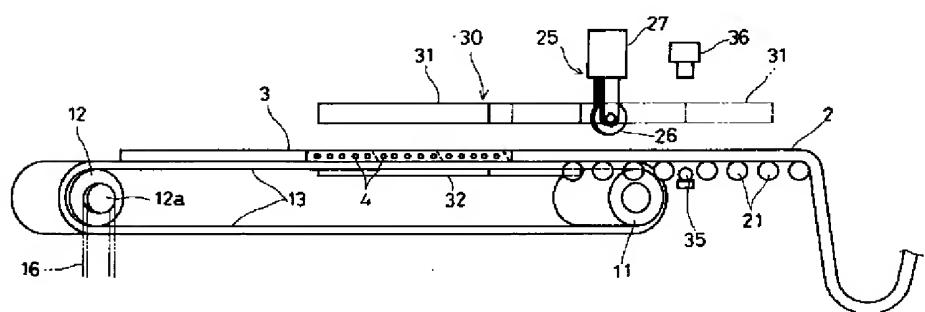
【図1】



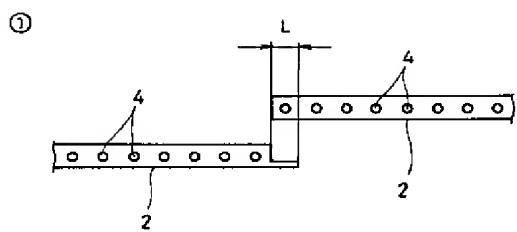
【図2】



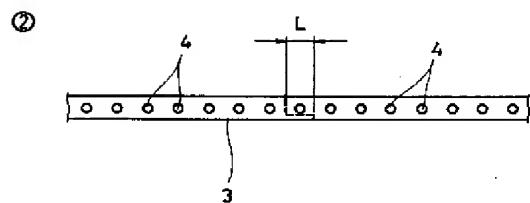
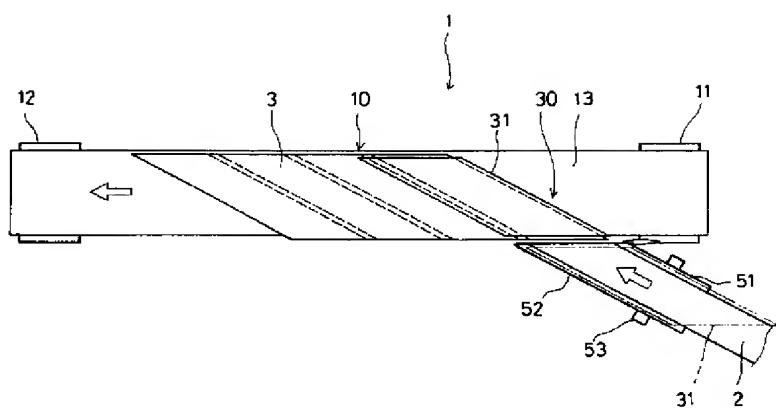
【図3】



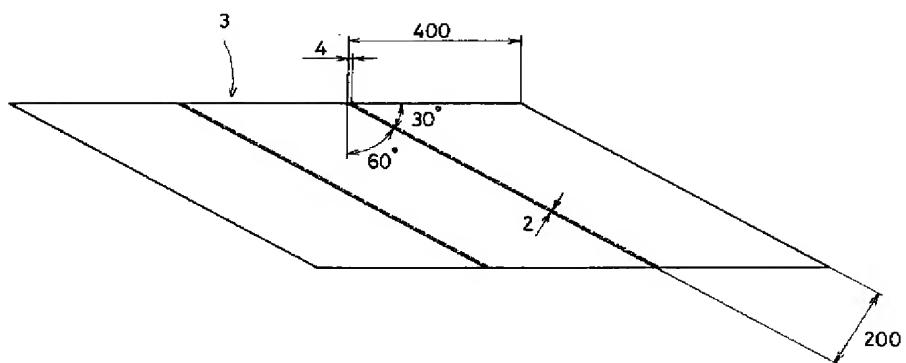
【図4】



【図6】



【図5】



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フロントページの続き

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テマコト(参考

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**DERWENT-ACC-NO:** 2000-446784

**DERWENT-WEEK:** 200039

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**TITLE:** Joining of strip embedded with steel cord for tire, involves controlling conveyor movement based on width of strip supplied on conveyor to adjust superposition width of edges of sequential strips on conveyor

**INVENTOR:** SUDA O

**PATENT-ASSIGNEE:** BRIDGESTONE CORP [BRID]

**PRIORITY-DATA:** 1998JP-333638 (November 25, 1998)

**PATENT-FAMILY:**

<b>PUB-NO</b>	<b>PUB-DATE</b>	<b>LANGUAGE</b>
JP 2000159399 A	June 13, 2000	JA

**APPLICATION-DATA:**

<b>PUB-NO</b>	<b>APPL-DESCRIPTOR</b>	<b>APPL-NO</b>	<b>APPL-DATE</b>
JP2000159399A	N/A	1998JP-333638	November 25, 1998

**INT-CL-CURRENT:**

<b>TYPE</b>	<b>IPC</b>	<b>DATE</b>
CIPP	B65H21/00	20060101
CIPS	B29D30/30	20060101
CIPN	B29K105/22	20060101
CIPN	B29K21/00	20060101
CIPN	B29L30/00	20060101

**ABSTRACTED-PUB-NO:** JP 2000159399 A

**BASIC-ABSTRACT:**

NOVELTY - The width of a strip (2) supplied on conveyor (13) is measured using measurement unit. Based on measured value, the amount of movement of conveyor is controlled so as to adjust superposition width of edge portions of preceding strip (3) and following strip (2) uniformly.

DESCRIPTION - The strip is continuously fed at a predetermined inclination angle on the conveyor moving the strip. A cutter (26) provided just before the conveyor disconnects the strip. Based on width of strip supplied on conveyor, amount of movement of conveyor is controlled so that superposition width of edge portions strip on conveyor and the strip further supplied is adjusted uniformly. Then, the pressure application and joining of superposition portion is performed with press joining unit. An INDEPENDENT CLAIM is also included for joining apparatus of strip in which the width measurement unit has CD camera (36) to take the photograph of strip supplied onto conveyor by supply unit, and analyzes the photography image and measures the width of strip. Alternately, a pair of guiders pinch both sides and supply unit of strip on the conveyor. The measurement unit measures strip width by computing distance between a pair of guiders.

USE - To join strip embedded with steel cord used for tire.

ADVANTAGE - Since the superposition width of edge portion of strips is uniform, poor joining is eliminated and quality is offered.

DESCRIPTION OF DRAWING(S) - The figure shows the entire schematic top view of joining apparatus of strip.

Strip (2,3)

Conveyor (13)

Cutter (26)

CD camera (36)

**CHOSEN-DRAWING:** Dwg.1/6

**TITLE-TERMS:** JOIN STRIP EMBED STEEL CORD CONTROL CONVEYOR  
MOVEMENT BASED WIDTH SUPPLY ADJUST SUPERPOSED EDGE  
SEQUENCE

**DERWENT-CLASS:** A35 A88 A95 Q36

**CPI-CODES:** A08-R05; A09-D01; A11-B17; A12-T01;

**ENHANCED-POLYMER-INDEXING:** Polymer Index [1.1] 018 ; H0124\*R;

Polymer Index [1.2] 018 ; ND01; K9892;  
K9416; Q9999 Q9256\*R Q9212; N9999  
N7261; N9999 N6348 N6337; N9999  
N6382\*R; N9999 N6611\*R; K9392; N9999  
N6360 N6337; N9999 N6622 N6611; N9999  
N5856; N9999 N6279 N6268;

Polymer Index [1.3] 018 ; G3189 D00 Fe  
8B Tr; A999 A419; S9999 S1672;

**SECONDARY-ACC-NO:**

**CPI Secondary Accession Numbers:** 2000-136243

**Non-CPI Secondary Accession Numbers:** 2000-333688

**PAT-NO:** JP02000159399A  
**DOCUMENT-IDENTIFIER:** JP 2000159399 A  
**TITLE:** METHOD AND DEVICE FOR JOINING STRIP MEMBER  
**PUBN-DATE:** June 13, 2000

**INVENTOR-INFORMATION:**

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**ASSIGNEE-INFORMATION:**

<b>NAME</b>	<b>COUNTRY</b>
BRIDGESTONE CORP	N/A

**APPL-NO:** JP10333638

**APPL-DATE:** November 25, 1998

**INT-CL (IPC):** B65H021/00 , B29C065/00 , B29D030/30

**ABSTRACT:**

PROBLEM TO BE SOLVED: To maintain quality by eliminating junction errors caused by variations in width among strip members.

SOLUTION: In a strip member joining method, a strip member 2 is supplied onto a conveyor 13 by a predetermined amount in a certain direction from a fixed side position and cut; the strip member 2 cut is moved by means of the conveyor 13 and the edge of a following strip member 2 supplied in succession is made to overlap the leading strip member 2 moved, with their overlapping parts joined together; the above processes are repeated. The width of the strip member 2 supplied onto the conveyor 13 is measured and the amount of movement of the conveyor 13 is controlled in accordance with this measurement to adjust the overlapping width of the leading and following strip members 2 to become almost constant.

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Notes:

1. Untranslatable words are replaced with asterisks (\*\*\*\*).
2. Texts in the figures are not translated and shown as it is.

Translated: 04:39:16 JST 03/13/2009

Dictionary: Last updated 03/10/2009 / Priority: 1. Manufacturing/Quality / 2. Automobile / 3. Technical term

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## FULL CONTENTS

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### [Claim(s)]

[Claim 1] Specified quantity supply of the band-like member is carried out in the fixed direction from the regular position of the side at a conveyor top. In the junction method of the band-like member which repeats successively cutting this band-like member, moving the cut band-like member by said conveyor, superimposing the edge part of the backward band-like member supplied continuously on the band-like member of said precedence which moved, and joining this superposition part. The junction method of the band-like member characterized by measuring the width length of the band-like member supplied on a conveyor, controlling the movement magnitude of a conveyor based on this observed value, and adjusting the superposition width of the band-like member of precedence, and a backward band-like member to approximately regulated.

[Claim 2] The conveyor which moves a band-like member, and the supply means which carries out specified quantity supply of the band-like member in the fixed direction from the regular position of the side at said conveyor top, The cutting means established just before said conveyor which supplies the band-like member of said supply means, A press junction means to press the superposition part of the band-like member of precedence, and a backward band-like member, and to join on said conveyor, A width length measurement means to measure the width length of the band-like member prepared and supplied near said cutting means, Have the control means which carries out drive control of said conveyor, said supply means, said cutting means, and said press junction means, and joins a series of band-like members, and [ said control means ] Junction equipment of the band-like member characterized by inputting the measurement signal of said width length measurement means, controlling the movement magnitude of said conveyor based on the observed value of this measurement signal, and adjusting the superposition width of the edge parts of the band-like member of precedence, and a backward band-like member to approximately regulated.

[Claim 3] Said supply means is junction equipment of the band-like member according to claim

2 characterized by supplying a band-like member in the direction of slant from the regular position on said conveyor.

[Claim 4] Said width length measurement means is junction equipment of the band-like member according to claim 2 or 3 characterized by photoing with a camera the band-like member supplied by said supply means, analyzing the photography picture, and measuring the width length of a band-like member.

[Claim 5] It is junction equipment of the band-like member according to claim 2 or 3 characterized by having a pair of guide members guided so that said supply means may pinch a band-like member from both sides, and for said width length measurement means measuring the distance between said a pair of guide members, and measuring the width length of a band-like member.

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#### [Detailed Description of the Invention]

##### [0001]

[Field of the Invention] This invention relates to the method and equipment which join a band-like member.

##### [0002]

[Description of the Prior Art] There is a method of cutting the band-like member which laid the steel code etc. under the inside one by one to predetermined length, joining in piles the ends which are not cutting planes to a tire component, and manufacturing a new band-like member.

[0003] As the equipment, specified quantity supply of the band-like member is carried out in the slanting predetermined direction from the predetermined position of the side at a conveyor. Cut along with the side edge of a conveyor and specified quantity movement of the cut band-like member is carried out by conveyor. A backward band-like member makes the end superimpose on the band-like member which carried out specified quantity supply of the band-like member on the conveyor in the slanting predetermined direction from the predetermined position continuously, and carried out specified quantity movement by said conveyor and to precede, and joins to it.

[0004] [ computing the movement magnitude of a conveyor beforehand from the width length of regulation of a band-like member and the necessary width length of a superposition part which are supplied, setting it as this movement magnitude, and carrying out drive control of the conveyor ] If the band-like member which only the set-up movement magnitude moves and carries out backward [ of the band-like member which a conveyor precedes ] is supplied, the mutual edge part of both the band-like member overlaps, and this superposition part can be joined.

[0005] That is, since the band-like member which is supplied by the supply means and cut is supplied one by one from the same position as the conveyor which moves intermittently with

fixed movement magnitude, the cut band-like member can arrange an edge part in piles in a fixed pitch on a conveyor, and bonding operation is performed efficiently.

[0006]

[Problem to be solved by the invention] However, that variation arises in that width length cannot avoid a band-like member easily due to the change in line speed, and the variation in this width length will turn into variation in the width length of that superposition part, if a band-like member is arranged at constant pitch on the conveyor which moves with fixed movement magnitude. The variation in the width length of this superposition part produces poor junction, produces the variation in the pitch of the code laid underground when it was the band-like member under which the code was laid, and becomes difficult [ it / to maintain quality ].

[0007] This invention was made in view of this point, and the place made into the purpose is at the point of offering the junction method of a band-like member and junction equipment which can cancel the poor junction produced by the variation in the width length of a band-like member, and can maintain quality.

[0008]

[Means for Solving the Problem and its Function and Effect] In order to attain the above-mentioned purpose, this invention carries out specified quantity supply of the band-like member in the fixed direction from the regular position of the side at a conveyor top. In the junction method of the band-like member which repeats successively cutting this band-like member, moving the cut band-like member by said conveyor, superimposing the edge part of the backward band-like member supplied continuously on the band-like member of said precedence which moved, and joining this superposition part. The width length of the band-like member supplied on a conveyor was measured, and it was considered as the junction method of the band-like member of controlling the movement magnitude of a conveyor based on this observed value, and adjusting the superposition width of the band-like member of precedence, and a backward band-like member to approximately regulated.

[0009] Even if variation is in the width length of the band-like member supplied on a conveyor, this width length that varied can be measured, the movement magnitude of a conveyor can be controlled based on this observed value, and the superposition width of the edge parts of the band-like member of precedence and a backward band-like member can be adjusted to approximately regulated. Therefore, the poor junction between band-like members can be canceled, and quality can be maintained highly.

[0010] The conveyor to which invention according to claim 2 moves a band-like member, and the supply means which carries out specified quantity supply of the band-like member in the fixed direction from the regular position of the side at said conveyor top, The cutting means established just before said conveyor which supplies the band-like member of said supply means, A press junction means to press the superposition part of the band-like member of precedence, and a backward band-like member, and to join on said conveyor, A width length

measurement means to measure the width length of the band-like member prepared and supplied near said cutting means, Have the control means which carries out drive control of said conveyor, said supply means, said cutting means, and said press junction means, and joins a series of band-like members, and [ said control means ] It is junction equipment of the band-like member which inputs the measurement signal of said width length measurement means, controls the movement magnitude of said conveyor based on the observed value of this measurement signal, and adjusts the superposition width of the edge parts of the band-like member of precedence, and a backward band-like member to approximately regulated.

[0011] Since a width length measurement means measures the width length of the band-like member supplied, the movement magnitude of a conveyor is controlled based on the observed value and the superposition width of the edge parts of the band-like member of precedence and a backward band-like member is adjusted to approximately regulated, the poor junction between band-like members can be canceled, and quality can be maintained highly.

[0012] Invention according to claim 3 is characterized by said supply means supplying a band-like member in the direction of slant from the regular position on said conveyor in the junction equipment of a band-like member according to claim 2.

[0013] If it is supplied in the direction of slant on a conveyor when the code is pointed to it and laid underground in the direction of a long picture by the band-like member supplied Where a code is aslant arranged to the conveyor move direction, a band-like member will be moved, the band-like member will be joined one by one in this move direction, and a code can form what is called the band-like member of the bias code laid underground aslant.

[0014] Invention according to claim 4 is characterized by for said width length measurement means photoing with a camera the band-like member supplied by said supply means, analyzing the photography picture, and measuring the width length of a band-like member in the junction equipment of a band-like member according to claim 2 or 3.

[0015] Since the band-like member supplied is photoed with a camera, the photography picture is analyzed and the width length of a band-like member is measured, the width length of a band-like member can be measured with sufficient accuracy by non-contact to a band-like member.

[0016] Invention according to claim 5 is set to the junction equipment of a band-like member according to claim 2 or 3. It is characterized by having a pair of guide members guided so that said supply means may pinch a band-like member from both sides, and for said width length measurement means measuring the distance between said a pair of guide members, and measuring the width length of a band-like member.

[0017] The width length of a band-like member can be measured by measuring the distance between guide members using the guide member which guides a band-like member.

[0018]

[Mode for carrying out the invention] The form of the 1 operation which relates to this invention

below is illustrated and explained to drawing 1 or drawing 5. The outline top view of the whole junction equipment 1 of the band-like member of the form of this operation is shown in drawing 1. The work which joins the band-like member 2 supplied, forms the new band-like member 3, and moves is done on a conveyor belt 10.

[0019] As for a conveyor belt 10, a pair of rotation rolls 11 and 12 are built over the conveyor belt 13 approximately. It is built over the timing belt 16 between the timing belt pulley 12a attached in the axis of rotation of one rotation roll 12, and the timing belt pulley 15a attached in the driving shaft of the AC servomotor 15. Therefore, the rotation roll 12 rotates through a timing belt 16 by the drive of the AC servomotor 15, and rotation of the rotation roll 12 rotates the conveyor belt 13, and moves the band-like member 3 on the conveyor belt 13.

[0020] The roller conveyor 20 which supplies the band-like member 2 from the side regular position towards the direction of fixed slant to this conveyor belt 10 is formed. In addition, you may only use a plate instead of the roller conveyor 20. This roller conveyor 20 is formed so that it may be in the rotation roll 11 side and the band-like member 2 can be supplied from left-hand side on the conveyor belt 13 at the angle of 30 degrees to the move direction of the conveyor belt 13.

[0021] Cutting equipment 25 is arranged so that a cutter 26 may run along the left-hand side edge of the conveyor belt 13 to which the band-like member 2 is supplied. A cutter 26 is attached to the lower edge of the elastic rod 27a projected under the cylinder 27, and cylinder 27 the very thing is hung so that it may run the upper part of the left-hand side edge of the conveyor belt 13 forward and backward.

[0022] To a cylinder 27 descending and running a cutter 26 forward and backward, a cutter 26 can cut the band-like member 3 supplied to the conveyor belt 13 along the left-hand side edge of the conveyor belt 13. In addition, what is called the thing of the guillotine type descended and carried through may be used for a cutter 26.

[0023] The band-like member 2 supplied to the conveyor belt 13 is what coated two or more steel codes 4 with rubber, and was fabricated to band-like, and the steel code 4 is in the state where it was directed and laid under the band-like longitudinal direction. And although ear rubber is formed in the both sides of the band-like member 2 in the process which carries out extrusion molding of the band-like member 2, as shown in drawing 4, left ear rubber is cut off and the band-like [ that the ear rubber 2a of the method of the right is left behind ] member 2 is supplied.

[0024] Although the band-like member 2 laid on the roller conveyor 20 is moved to the conveyor belt 13, drawer equipment 30 is constructed up. the band-like member 2 from which drawer equipment 30 was cut, and abbreviation -- [ the fixing disc 31 which carried out the shape of same parallelogram is hung from Kamigata with the level posture, and ] Width is a little larger than the band-like member 2, the electromagnet is built in the inside, and this fixing disc 31 can attract the steel code 4 in the band-like member 2, and can adsorb the band-like

member 2.

[0025] The fixing disc 31 is hung possible [ rise and fall ] up and down while supporting between Kamigata and Kamigata of the conveyor belt 13 who extended of the end of the roller conveyor 20 free [ a round trip ] along the conveyance direction of the band-like member 2.

[0026] Therefore, a tip part is adsorbed by taking down a fixing disc 31 to the tip part of the band-like member 2 conveyed by roller conveyor 20, and magnetizing an electromagnet. It can pull up upwards, adsorbing, a fixed quantity can be pulled out to the direction of the conveyor belt 13, it can take down to the regular position, and the band-like member 2 can be supplied on the conveyor belt 13 by demagnetizing an electromagnet.

[0027] In addition, from the band-like member 2, the fixing disc 31 with a little large width is used as a press junction means, on the band-like member 2 on which edge parts were made to superimpose on the conveyor belt 13, presses a fixing disc 31 and joins an edge part. Along with the conveyor belt 13, the strike plate 32 is formed in the back bottom of the conveyor belt 13 to press of a fixing disc 31.

[0028] Between the rollers 21 and 21 in the middle of the roller conveyor 20 which supplies the band-like member 2, it directed crosswise, the long fluorescent light 35 was arranged, the band-like member 2 conveyed was irradiated from the bottom, and light has overflowed both sides. Right above the fluorescent light 35, CCD camera 36 is hung up on both sides of the band-like member 2. The signal which CCD camera 36 detected is inputted into a computer, and is analyzed.

[0029] Therefore, CCD camera 36 picturizes the light which the light irradiated from the band-like member 2 bottom was interrupted by the band-like member 2, and protruded from both sides. A computer can calculate an actual distance which the distance between both pixels shows from the pixel of the both sides which detected this light, and the width length (the ear rubber 2a is included) of the band-like member 2 can be measured.

[0030] Thus, CCD camera 36 can measure width length with sufficient accuracy by non-contact to the band-like member 2. In addition, CCD camera 36 is in a position higher than the fixing disc 31 of drawer equipment 30, and it does not interfere in it mutually.

[0031] The computer which calculates the width length of the band-like member 2 carries out drive control of the AC servomotor 15 which rotates the conveyor belt 13 of said conveyor belt 10 based on the width length of this band-like member 2.

[0032] In the beginning which is joined first if this junction equipment 1 is constituted as mentioned above and the procedure of operation is explained The fixing disc 31 of drawer equipment 30 adsorbs the tip part of the band-like member 2 on the roller conveyor 20, and a fixed quantity is pulled out at the angle of 30 slant on the conveyor belt 13. It lays on the stopped conveyor belt 13, and subsequently, it descends, and runs the cutter 26 of cutting equipment 25, and the band-like member 2 is aslant cut along the left-hand side edge of the conveyor belt 13.

[0033] CCD camera 36 picturizes the backward band-like member 2 pulled out by the next on the roller conveyor 20 in the meantime, and the computer calculates the width length of the band-like member 2. And while returning a cutter 26 to the original home position, adsorption is solved, the conveyor belt 13 is rotated by the drive of the AC servomotor 15, and only necessary movement magnitude moves the band-like member 2 which went up and released the fixing disc 31.

[0034] [0035] which moves in accuracy only with high movement magnitude which the computer determined this movement magnitude based on the width length of the backward band-like member 2 which calculated previously, and drive control of the AC servomotor 15 was carried out [ movement magnitude ], and had the band-like member 2 of precedence determined And it moves onto the roller conveyor 20, and the fixing disc 31 of drawer equipment 30 adsorbs the tip part of the backward band-like member 2, on the conveyor belt 13, it is pulled out in fixed quantity and laid at movement and abbreviation coincidence by the conveyor belt 13.

[0036] Only necessary movement magnitude is moved by the band-like member 2 of precedence so that the edge may overlap in part in the backward band-like member 2 later laid to the band-like member 2 of precedence. The front end edge of the abbreviation backward band-like member 2 is overlapped on the portion of the ear rubber 2a which hits the back end edge of the band-like member 2 of precedence to the conveyance direction of the conveyor belt 13 (refer to drawing 4 \*\* and \*\*), and the movement magnitude of the band-like member 2 of precedence is controlled so that the superposition width L always turns into necessary fixed width. The postscript of the example of calculation of the movement magnitude of the band-like member 2 of the precedence by this conveyor belt 13 is carried out.

[0037] In this way, the backward band-like member 2 which superimposed the edges by the necessary fixed width L, and was laid with the fixing disc 31 is pressed from Kamigata with a fixing disc 31, sticks a superposition part by pressure and joins. And it runs the cutter 26 of cutting equipment 25, the backward band-like member 2 is aslant cut along the left-hand side edge of the conveyor belt 13, CCD camera 36 picturizes the band-like member 2 pulled out on the roller conveyor 20 next in the meantime, and the computer calculates the width length of the band-like member 2.

[0038] The above work is done repeatedly one by one, and the new band-like member 3 is formed. The new band-like member 3 will form what is called the band-like member of the bias code under which the code was laid aslant.

[0039] When joining the band-like member 2, by controlling the movement magnitude of the band-like member 2 of precedence based on the width length of the backward band-like member 2, even if variation is in the width length of the band-like member 2, superposition width can always be maintained to necessary fixed width, and poor junction is not produced.  
[0040] If the front end edge of the band-like member 2 backward [ in general ] with the fixed

width L to an ear rubber 2a portion of the band-like member 2 preceded as the superposition width L is shown in \*\* of drawing 4 by maintaining to necessary fixed width overlaps, it is stuck by pressure and it is joined It will be in the state where the steel code 4 laid under the inside of the band-like member 3 was arranged at the approximately predetermined interval also in connection, as [ show / in \*\* of drawing 4 ], and improvement in quality can be aimed at.

[0041] An example which controls the movement magnitude which moves the band-like member 2 of precedence based on the width length of the backward band-like member 2 is explained based on drawing 5. The specified quantity drawer of the band-like member of 200mm width shall be carried out, it shall be cut at the angle of 60 degrees, and superposition width shall be 2mm.

[0042] Since end faces will contact without overlapping in the backward band-like member 2 when the band-like member 2 of precedence is moved 400mm, 396mm, then superposition width which reduced 4mm movement magnitude can be 2mm. Whenever 200mm is secured always correctly [ the width length of the band-like member 2 ], although what is necessary is just to move 396mm, that fixed variation arises in the width length cannot avoid the band-like member 2 easily due to the change in line speed.

[0043] If the band-like member 2 of precedence was moved 396mm supposing the width length of the now backward band-like member 2 was set to 199mm, superposition width will run short 1mm. Then, what is necessary is to compute the movement magnitude of 394mm, in order to secure superposition 2mm in width from the width length of 199mm of the backward band-like member 2, and just to carry out move control of the band-like member 2 of precedence. Moreover, when the width length of the band-like member 2 is conversely set to 201mm, the movement magnitude of 398mm, then superposition 2mm in width can be secured.

[0044] By controlling the movement magnitude of the band-like member 2 of precedence based on the width length of the backward band-like member 2 as mentioned above, even if variation is in the width length of the band-like member 2, superposition width is always maintainable to necessary fixed width.

[0045] Although the width length of the band-like member was picturized and measured with the CCD camera with the form of the above operation, the form of the operation measured by another method is shown in drawing 6. In addition, everything but a measurement means is the same as the form of said operation, and the same member uses the same mark.

[0046] While the guide members 51 and 52 of each other which perform a middle position arrangement are arranged in the both sides of the roller conveyor 20 which supplies the band-like member 2 to the conveyor belt 13 symmetrically free [ movement ] to Chuo Line Both the guide members 51 and 52 are energized in the direction which approaches mutually, and as they sandwiched the band-like member 2 in between, they have guided it to it.

[0047] The width length of the band-like member 2 can be measured because a voltage divider

53 detects a motion of both these guide members 51 and 52. The superposition width which controls the AC servomotor 15 based on this measurement result, adjusts the movement magnitude of the conveyor belt 13, and is applied to junction can be maintained uniformly, and poor junction can be prevented.

[0048] Although the drawer equipment of the form of the above operation was a fixing disc by an electromagnet, you may make it adsorb a band-like member by a vacuum means to attract air. It has a press junction means separately, the superposition part of a band-like member is pressed, and it is made to join.

[0049] The roller around which it continued above the conveyor belt 13 crosswise as a press junction means, and sponge was wound is formed enabling free rise and fall, and when the band-like members 2 and 2 which piled up the edge part are conveyed with the conveyor belt 13, there is the method of joining a superposition part in response to press of said roller.

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#### [Brief Description of the Drawings]

[Drawing 1] It is the outline top view of the whole junction equipment of the band-like member concerning the form of operation of this invention.

[Drawing 2] It is the side view of a conveyor belt.

[Drawing 3] It can set to drawing 1 . It is an III \*\*\*\* figure.

[Drawing 4] It is the explanatory view showing the situation of junction of a band-like member.

[Drawing 5] It is one example which shows the state of junction of a band-like member.

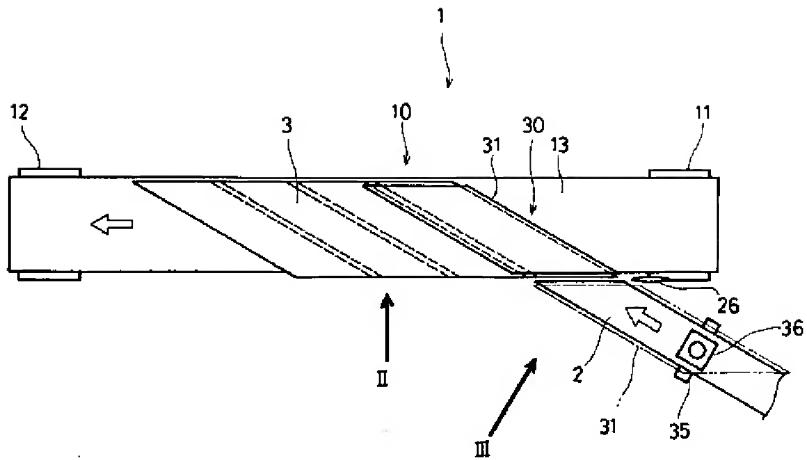
[Drawing 6] It is the outline top view of the junction equipment of the form of another operation.

#### [Explanations of letters or numerals]

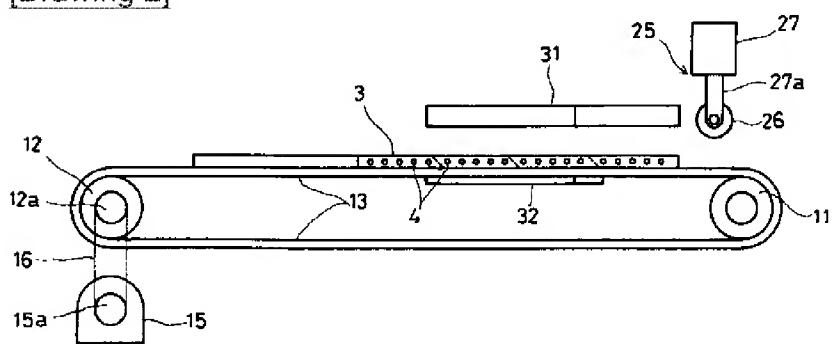
1 [ -- Conveyor belt, ] -- Junction equipment, 2, 3 -- A band-like member, 4 -- A steel code, 10  
11, 12 -- A rotation roll, 13 -- A conveyor belt, 15 -- AC servomotor, 16 [ -- A cutting means,  
26 / -- A cutter, 27 / -- A cylinder, 30 / -- Drawer equipment, 31 / -- A fixing disc, 32 / -- A strike  
plate, 35 / -- A fluorescent light, 36 / -- A CCD camera, 51, 52 / -- A guide member, 53 / --  
Voltage divider. ] -- A timing belt, 20 -- A roller conveyor, 21 -- A roller, 25

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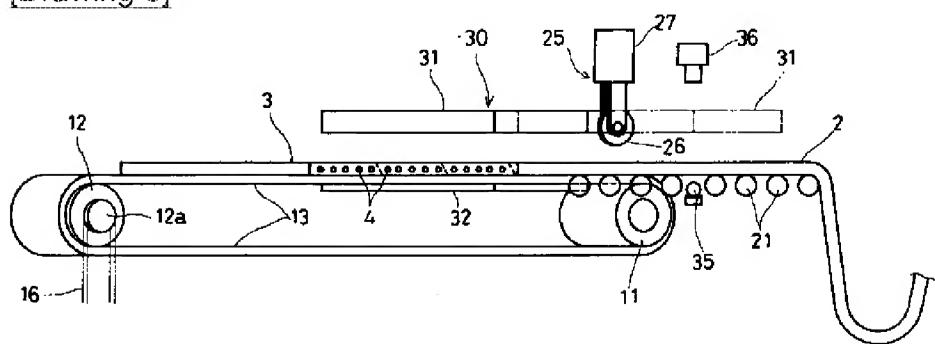
#### [Drawing 1]



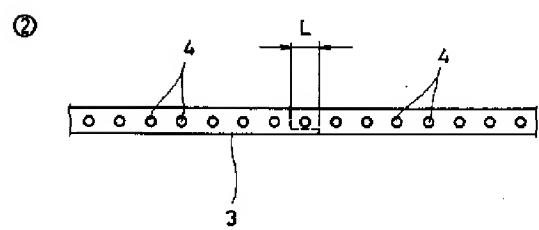
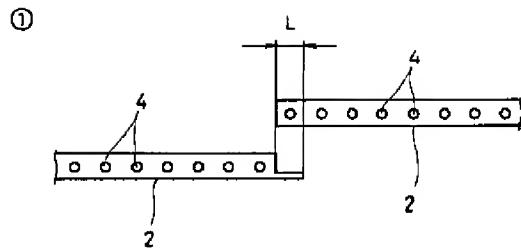
[Drawing 2]



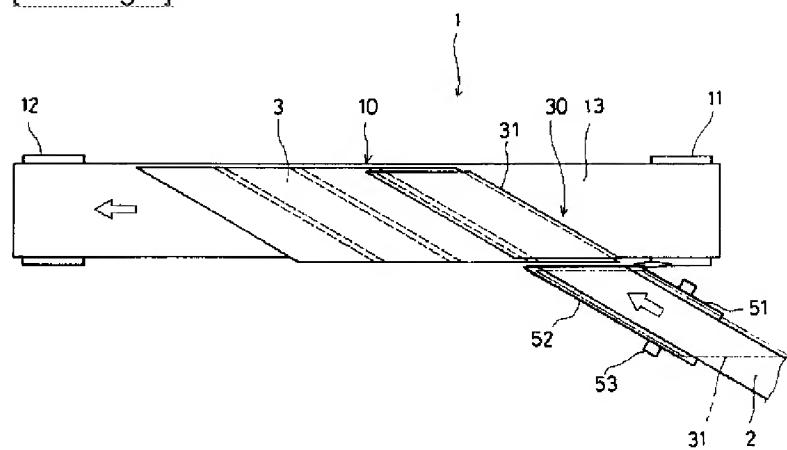
[Drawing 3]



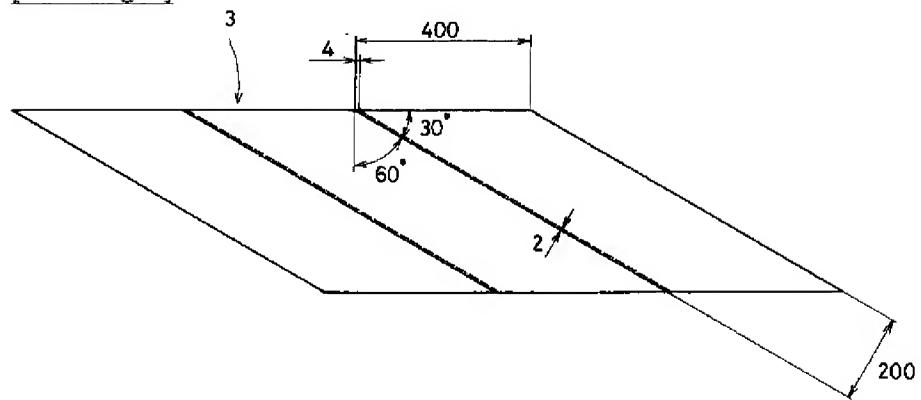
[Drawing 4]



[Drawing 6]



[Drawing 5]



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[Translation done.]